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THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Appl. No. : 10/685,631 Confirmation No.: 4989
Appellants : James T. Beals et al
Filed : October 15, 2003
TC/A.U. : 1725
Examiner : Ing Hour Lin

Docket No. : 085-11057-US(03-545)
Customer No. : 52237

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313

APPEAL BRIEF

Sir:

This is an appeal to the Board of Patent Appeals and Interferences from the final rejection of claims 1, 3 - 12, 14 - 19, 24 and 25, dated February 23, 2006, made by the Primary Examiner in Group Art Unit 1725.

REAL PARTY IN INTEREST

The real party in interest is United Technologies Corporation of Hartford, Connecticut.

RELATED APPEALS AND INTERFERENCES

There are no other prior and pending appeals, interferences or judicial proceedings known to Appellants, Appellants' legal representative, or Assignee which may be related to, directly affect, or be directly affected by or have a bearing on the Board's decision in the pending appeal.

STATUS OF CLAIMS

Claims 1, 3 - 12, 14 - 19, 24 and 25 are pending in the application and are on appeal. An appendix containing the claims on appeal is attached hereto.

Claims 2, 13, and 20 - 23 have been previously cancelled.

STATUS OF AMENDMENTS

No amendment was filed subsequent to the final rejection.

SUMMARY OF CLAIMED SUBJECT MATTER

The claims on appeal relate to a casting system including a refractory metal core, which metal core has means for providing oxidation resistance during shell fire and protection against reaction/dissolution during casting. As set forth in independent claim 1, the oxidation resistance and protection means is a coating consisting of aluminum silicate. See page 2, paragraph 0013; also see page 4, paragraph 0027.

Claim 6 depends from claim 1 and states that the core is formed from a material selected from the group consisting of molybdenum, tantalum, niobium, tungsten, alloys thereof, and intermetallic compounds thereof. See page 4, paragraph 0022.

Claim 7 depends from claim 1 and states that the core is formed from molybdenum. See page 4, paragraph 0022.

Independent claim 3 on appeal relates to a casting system including a refractory metal core, which metal core has means for providing oxidation resistance during shell fire and protection against reaction/dissolution during casting. As set forth in claim 3, the oxidation resistance and protection means is a coating consisting of a layer formed from a silicide. See page 2, paragraph 0013;also see page 5, paragraph 0028.

Independent claim 4 on appeal relates to a casting system including a refractory metal core, which metal core has means for providing oxidation resistance during shell fire and protection against reaction/dissolution during casting. As set forth in claim 4, the oxidation resistance and protection means is a coating consisting of zirconium silicate. See page 2, paragraph 0013; see pages 4 and 5, paragraph 0027.

Independent claim 8 relates to a casting system including a refractory metal core, which metal core has means for providing oxidation resistance during shell fire and protection against reaction/dissolution during casting. As set forth in claim 8, the oxidation resistance and protection means is a coating consisting of an oxide selected from the group consisting of calcia, magnesia, alumina, zirconia, chromia, yttria, silica, and hafnia. See page 2, paragraph 0013; also see page 3, paragraph 0014 and page 5, paragraph 0028.

Claim 9 depends from claim 8 and states that the coating is chromia and further comprises a chromium coating applied to form the chromia. See page 5, paragraph 0033.

Claim 10 depends from claim 8 and states that the coating is silica and further comprises a silicide coating applied to form the silica. See page 5, paragraph 0033.

Independent claim 11 is directed to a casting system including a refractory metal core, which metal core has means for providing oxidation resistance during shell fire and protection against reaction/dissolution during casting. As set forth in claim 11, the oxidation resistance and protection means comprises a coating comprising a nitride selected from the group consisting of silicon nitride, sialon, titanium, nitride, and mixtures thereof. See page 2, paragraph 0013; also see page 3, paragraph 0015 and page 5, paragraph 0028.

Independent claim 12 is directed to a casting system including a refractory metal core, which metal core has means for providing oxidation resistance during shell fire and protection against reaction/dissolution during casting. As set forth in claim 12, the oxidation resistance and protection means comprises a coating comprising a carbide selected from the group consisting of silicon carbide, titanium carbide, tantalum carbide, and mixtures thereof. See page 2, paragraph 0013; also see page 3, paragraph 0016 and page 5, paragraph 0028.

Independent claim 14 is directed to a casting system including a refractory metal core, which metal core has means for providing oxidation resistance during shell fire and protection against reaction/dissolution during casting. As set forth in claim 14, the oxidation resistance and protection means comprises a coating comprising a ceramic coating and a layer comprising a metal selected from the group consisting of nickel, platinum, chromium, silicon, and alloys thereof. See page 2, paragraph 0013; also see page 5, paragraph 0030.

Claim 17 depends from claim 14 and states that the ceramic coating comprises an oxide material. See page 5, paragraph 0030.

Independent claim 15 is directed to a casting system including a refractory metal core, which metal core has means for providing oxidation resistance during shell fire and protection against reaction/dissolution during casting. As set forth in claim 15, the oxidation resistance and protection means comprises a coating, which coating comprises a ceramic coating and a layer between the refractory metal forming the refractory metal core and the ceramic coating. The layer is formed from an intermetallic selected from the group consisting of NiAl and

$MoSi_2$. See page 2, paragraph 0013; also see page 5, paragraph 0030.

Independent claim 16 is directed to a casting system including a refractory metal core, which metal core has means for providing oxidation resistance during shell fire and protection against reaction/dissolution during casting. As set forth in claim 16, the oxidation resistance and protection means comprises a coating, which coating comprises a ceramic coating and a layer between the refractory metal forming the refractory metal core and the ceramic coating. The layer is formed from a material selected from the group consisting of TiC, TiN, and Si_3N_4. See page 2, paragraph 0013; also see page 5, paragraph 0030.

Independent Claim 18 is directed to a casting system including a refractory metal core, which metal core has means for providing oxidation resistance during shell fire and protection against reaction/dissolution during casting. As set forth in claim 18, the refractory metal core is formed from molybdenum and has an etched surface. The oxidation resistance and protection means comprises a coating overlaying the etched surface. The coating consists of alumina which has been chemically vapor deposited. See page 2, paragraph 0013; also see page 3, paragraph 0018 and page 5, paragraph 0029.

Independent claim 19 is directed to a casting system including a refractory metal core, which metal core has means for providing oxidation resistance during shell fire and protection against reaction/dissolution during casting. As set forth in claim 19, the casting system further has a top coat overlaying the oxidation resistance and protection means, which top coat is formed from an aluminide. See page 2, paragraph 0013; also see page 5, paragraph 0031.

Independent claim 24 is directed to a casting system including a refractory metal core, which metal core has means for providing oxidation resistance during shell fire and protection against reaction/dissolution during casting. As set forth in claim 24, the refractory metal core is formed from molybdenum and has an etched surface. The oxidation resistance and protection means overlays the etched surface and comprises a coating which comprises alternating layers of alumina and a material selected from the group consisting of TiCN and zirconia. See page 2, paragraph 0013; also see pages 3 and 4, paragraph 0020 and page 5, paragraph 0032.

Independent claim 25 relates to a casting system including a refractory metal core, which metal core has means for providing oxidation resistance during shell fire and protection against reaction/dissolution during casting. The refractory metal core is formed from a material selected from the group consisting of tantalum, niobium, tungsten, alloys thereof, and intermetallic compounds thereof. The oxidation resistance and protection means is a coating, which coating comprises at least one oxide and/or a silicon containing material. See page 2, paragraph 0013; also see page 4, paragraph 0022; also see paragraph 0027 on pages 4 and 5.

Claim 5 depends from claim 25 and states that the oxide comprises alumina. See paragraph 0027 on pages 4 and 5.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The grounds of rejection to be reviewed on appeal are as follows:

(1) the rejection of claims 5, 18, and 25 under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 3,957,104 to Terpay;

(2) the rejection of claims 1, 5 - 10, 18 and 25 under the judicially created doctrine of obviousness type double patenting over U.S. Patent No. 6,637,500 to Shah;

(3) the rejection of claims 1, 3, 4, and 6 - 10 under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,287,932 to Schneider or U.S. Patent No. 3,011,233 to Kirtchik in view of U.S. Patent No. 3,390,013 to Rubisch et al.;

(4) the rejection of claims 11 and 12 under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,308,806 to Maloney et al.;

(5) the rejection of claim 12 under 35 U.S.C. 103(a) as being unpatentable over Schneider or Kirtchik in view of U.S. Patent No. 5,270,112 to Lucko et al;

(6) the rejection of claims 14 and 17 under 35 U.S.C. 103(a) as being unpatentable over Schneider or Terpay in view of U.S. Patent No. 2,682,101 to Whitfield;

(7) the rejection of claims 15 and 16 under 35 U.S.C. 103(a) as being unpatentable over Schneider or Terpay in view of either U.S. Patent No. 5,223,045 to Priceman or U.S. Patent No. 4,762,557 to Nagarajan et al.;

(8) the rejection of claim 18 under 35 U.S.C. 103(a) as being unpatentable over Schneider or Terpay in view of U.S. Patent No. 3,372,297 to Pearsall et al.;

(9) the rejection of claim 19 under 35 U.S.C. 103(a) as being unpatentable over Schneider or Terpay in view of U.S. Patent No. 6,746,782 to Zhao et al; and

(10) the rejection of claim 24 under 35 U.S.C. 103(a) as being unpatentable over Schneider or Kirtchik in view of U.S. Patent No. 5,472,795 to Atita.

ARGUMENT

(a) Patentability of Claims 5, 18, and 25

It is well settled law that in order for a reference to anticipate a claim each and every element set forth in the claim must be found either expressly or inherently in the reference. Both independent claims 18 and 25 call for a refractory metal core having an etched surface and a coating overlaying the etched surface. The Terpay patent relied upon by the Examiner to reject claims 5, 18, and 25 does not meet all the limitations set forth in claims 18 and 25. One of ordinary skill in the art would not consider the pins 11 in Terpay to be a core. The core in Terpay is formed by the mold member 12. Even if one could somehow construe the pins to be cores, there is no disclosure in Terpay of the pins having an etched surface. This is confirmed by the fact that the Examiner completely ignores this limitation in making the rejection. For these reasons, claims 18 and 25, as well as claim 5, are allowable over Terpay.

(b) The Obviousness Type Double Patenting Rejection of Claims 1, 5 - 10, 18 and 25 Is Flawed

The rejection of claims 1, 5 - 10, 18 and 25 on the grounds of obviousness type double patenting is fatally flawed. First, the Examiner has not explained any basis for the conclusion as to why the claims are not patentably distinct. Second, the

Examiner has not stated what would motivate one of ordinary skill in the art to remove the at least one ceramic element set forth in claims 1 and 14 of the '500 patent given the fact that the cited patent, as well as the claims thereof, are directed to a composite core which has at least one ceramic element and at least one refractory metal element. With regard to claim 1, it is patentably distinct because it calls for a coating consisting of aluminum silicate which is not covered by the claims in the '500 patent. Claims 5 - 10 are allowable because neither claim 1 nor claim 14 in the '500 patent call for the materials set forth in the claims. In making an obviousness type double patenting rejection, the Examiner can not rely upon the disclosure in the '500 patent to cure the gaps in the claims. With regard to claims 18 and 25, the Examiner again completely ignores the fact that these claims call for the refractory metal core to have an etched surface. For these reasons, the obviousness type double patenting rejection of claims 1, 5 - 10, 18 and 25 should be reversed.

(c) Claims 1, 3, 4, and 6 - 10 Are Not Obvious Over Schneider or Kirtchik in view of Rubisch

With regard to the rejection of claims 1, 3, 4, and 6 - 10 over Schneider or Kirtchik in view of Rubisch, it should be noted that Schneider relates to a molybdenum core in the form of wires having an alumina coating. Kirtchik relates to refractory sulfide containing cores for use in providing openings in cast metal articles. The cores have a metallic inner element and an outer coating of refractory sulfide or mixture of refractory sulfides. The metallic inner element may be a wire formed from tungsten or molybdenum. The primary references however fail to teach or suggest the coatings set forth in independent claims 1, 3, 4, and 8. The Rubisch patent relied upon by the Examiner discloses a coating which includes a plurality of oxides and a getter substance (see column 2, lines 19 - 47).

Independent claim 1 is allowable because none of the cited and applied references, taken alone or collectively, teach or suggest a coating consisting of aluminum silicate. Clearly, Rubisch does overcome the deficiencies of the primary references. Rubisch does not teach or suggest a coating consisting solely of aluminum silicate.

Independent claim 3 is allowable because none of the cited and applied references teach or suggest a coating consisting of a layer formed from a silicide. Again, Rubisch does not overcome the deficiencies of the cited and applied primary references. Rubisch does not teach or suggest a coating consisting of a layer formed from a silicide. All of Rubisch's coatings include a base substance composed of silicon oxide, aluminum oxide, earth alkali oxide, and an alkali oxide. While the getter substance may teach the use of a metal silicide, the language of claim 3 excludes Rubisch's oxide containing coatings.

Independent claim 4 is allowable because none of the cited and applied references taken alone or collectively teach or suggest a coating consisting of zirconium silicate. Claim 4 is allowable because none of the cited and applied references, taken alone or collectively, teach or suggest a coating consisting of zirconium silicate. Again, Rubisch does not overcome the deficiencies of the cited and applied primary references. Rubisch does not teach or suggest a coating consisting of zirconium silicate. All of Rubisch's coatings include a base substance composed of silicon oxide, aluminum oxide, earth alkali oxide, and an alkali oxide. While the getter substance may teach the use of a metal silicide, the language of claim 4 excludes Rubisch's oxide containing coatings.

Claims 8 - 10 are allowable because none of the cited and applied references teach or suggest the claimed coating. None of the references teach or suggest a coating consisting of an oxide selected from the group consisting of calcia, magnesia, alumina, zirconia, chromia, yttria, silica and hafnia. While Rubisch may teach applying a coating containing an oxide, Rubisch's coatings also include a getter substance. The "consisting of" language of claim 8 excludes any coating such as Rubisch's containing a getter substance. Therefore, even if Kirtchik or Schneider was modified according to the teachings of Rubisch, the combination would not meet the limitations of the claims. With respect to claims 9 and 10, none of the cited and applied references teach or suggest either a chromia or a silica coating.

Claims 6 and 7 are allowable for the same reasons as their parent claims.

With respect to the Examiner's comments on pages 8 and 9 of the final rejection, the Board's attention is called to the fact that Example 1 in Rubisch includes CaF_2 and molybdenum silicide in the aqueous suspension. Thus any coating on the molybdenum electrodes would not consist solely of aluminum silicate. Example 4 also has additional constituents which would not produce a coating consisting of aluminum silicate.

Still further, it should be noted that the obviousness rejections based on Rubisch are further flawed since Rubisch comes from non-analogous art. The Rubisch patent relates to the protection of an electrode, not the protection of a refractory metal core. One of ordinary skill in the art would not reasonably look to Rubisch as teaching one how to form a protective coating on a refractory metal core to be used in a metal casting system since a metal casting system operates under very different conditions than an electrode.

(d) Claims 11 and 12 Are Patentable Over the Combination of Schneider Or Kirtchik in view of Rubisch And Maloney et al.

Independent claims 11 and 12 are allowable as presented. The rejection made by the Examiner makes no sense. Clearly, the primary references to Schneider or Kirtchik do not disclose the nitride coating of claim 11 and the carbide coating of claim 12. Rubisch has been previously discussed and the remarks about same are incorporated herein. With respect to claims 11 and 12, it can be said that Rubisch does not teach or suggest either a nitride coating or a carbide coating. Maloney et al relates to a method for modifying the coefficient of thermal expansion of a molybdenum disilicide matrix material used as a reinforced intermetallic matrix composite. The Maloney et al. invention is directed to the addition to a molybdenum disilicide matrix of from about 15 to 60 percent by volume of a particulate modifying agent selected from powders, platelets, and whiskers of silicon carbide, silicon nitride, boron nitride or silica, or mixtures thereof. The composite further comprises a continuous reinforcing fiber selected from tungsten, niobium, molybdenum, tantalum, and alloys thereof. Maloney et al. has nothing to do with a casting system.

There is no explanation in the rejection as to why one of ordinary skill in the art would be motivated to first apply the Rubisch coating to the metal core of Kirtchik or Schneider and then modify the Rubisch coating according to the teachings of Maloney. This is particularly true given the fact that neither claim 11 nor claim 12 calls for the coating to include molybdenum silicide. Therefore, there is no reason to modify the coatings of the primary reference to include a molybdenum silicide coating to alter the coefficient of thermal expansion. Still further, there is absolutely no reason for one of ordinary skill in the art to modify the coatings of Kirtchik or Schneider to have the claimed nitride and/or carbide coatings. Certainly, Maloney does not teach this. As noted above, Maloney has nothing at all to do with casting and how one would modify a refractory metal core to provide oxidation resistance during shell fire and protection against reaction/dissolution during casting. Maloney et al. merely teaches one how to modify a matrix material. For these reasons, one of ordinary skill in the art would not be motivated to combine the references in the manner suggested by the Examiner.

(e) Claim 12 Is Allowable Over The Combination of Schneider or Kirtchik In View Of Lukco et al.

The Schneider and Kirtchik references have been discussed above. Clearly, both of these references lack the claimed carbide coating for providing oxidation resistance during shell fire and protection against reaction/dissolution during casting.

The Lucko et al. patent relates to hybrid reinforcements for high temperature composites and composites made therefrom. The Lucko et al. patent has nothing to do with a refractory metal core to be used in a casting system and to its protection during shell fire and casting. The Lucko et al. patent relates to a hybrid reinforcement material comprising a refractory metal core having a first coating comprising aluminum, oxygen and nitrogen and a second silicon carbide coating. The Al-O-N coating is specifically applied in Lucko et al. because it has excellent oxidation resistance and prevents the diffusion of Si and C. See column 3, lines 20 - 26.

As for the rejection of claim 12 over Schneider or Kirtchik in view of Lukco et al., it is submitted that one of ordinary skill in the art would not combine the references in the manner suggested by the Examiner. There is absolutely nothing in the cited and applied references which would motivate one of ordinary skill in the art to combine the references since Lucko et al. says nothing about protecting a refractory metal core to be used in a casting system during shell fire and casting. Even if one were to somehow be motivated to combine the references, one of ordinary skill in the art would find the SiC coating to be superfluous. After all, it is the Al-O-N coating which provides the oxidation resistance. Therefore, if one of ordinary skill in the art were somehow motivated by the teachings of Lucko et al., he/she would apply the Al-O-N to the refractory metal core, not the SiC coating.

(f) Claims 14 and 17 Are Patentable Over The Combination of Schneider Or Terpay In View of Whitfield.

With regard to the rejection of claims 14 and 17, as noted by the Examiner, neither Schneider nor Terpay disclose an intermediate coating layer between the molybdenum metal core and a ceramic coating. The same is true of Whitfield et al. Whitfield et al. teaches the use of a nickel intermediate layer; however, the outer layer is formed from aluminum, not a ceramic coating. It should also be noted that Whitfield et al. is from non-analogous art since it has nothing at all to do with casting systems and the protection of a refractory metal core. The mere fact that the Examiner can find a claimed element somewhere in the prior art does not mean that an obviousness rejection is appropriate.

It is submitted that the subject matter of claim 14 is not obvious from the proposed combination of references. First, one of ordinary skill in the art would not be motivated to make the proposed combination of references since Whitfield is not from analogous art. Second, even if one of ordinary skill in the art would somehow be motivated to follow the teachings of Whitfield, he/she would replace the ceramic coating by an outer layer of aluminum pursuant to Whitfield's teaching.

Claim 17 is allowable for the same reasons that claim 14 is allowable. Whitfield does not teach or suggest using a ceramic coating comprising an oxide material.

(g) Claims 15 and 16 Are Allowable Over The Combination of Schneider Or Terpay In view of Priceman or Nagarajan et al.

With regard to the rejection of claims 15 and 16, neither Schneider nor Terpay teach or suggest the claimed intermediate layer. This deficiency is not cured by either of the secondary references. Priceman is from non-analogous art. It provides no teaching of how to protect a refractory metal core during shell fire and casting. The Priceman patent is directed to protecting turbine engine components, which is an entirely different environment. One of ordinary skill in the art would not be motivated to combine Priceman with either Schneider or Terpay for this reason. With regard to claim 15, there is nothing in Priceman which would teach one of ordinary skill in the art to form the layer from an intermetallic selected from the group consisting of NiAl and $MoSi_2$. With respect to claim 16, there is no disclosure in Priceman of forming the layer from a material selected from the group consisting of TiC, TiN, and Si_3N_4.

With respect to Nagarajan et al., there is no disclosure of the claimed intermediate layer and ceramic outer coating. This patent relates to the addition of second and third phase additives in a composition containing a refractory metal. Thus, this patent is from non-analogous art. One of ordinary skill in the art would not be motivated to combine the teachings of Nagarajan et al. with either Schneider or Terpay since Nagarajan et al. has nothing at all to do with forming a protective coating which provides oxidation resistance during shell fire or protection against reaction/dissolution during casting. Even if one of ordinary skill in the art were somehow motivated to combine the references, one of ordinary skill in the art would not arrive at the claimed coating and intermediate layer. All one would do is modify the structure of the refractory metal core.

(h) Claim 18 Is Allowable Over Schneider or Terpay In View Of Pearsall

Claim 18 is directed to a refractory metal core having means for providing oxidation resistance during shell fire and protection against reaction/dissolution during casting. The refractory metal core is formed from molybdenum and has an etched surface. The oxidation resistance and protection providing means comprises a coating overlaying the etched surface, which coating consists of alumina which has been chemically vapor deposited.

Neither Schneider nor Terpay teaches the use of an alumina coating overlaying an etched surface.

The Pearsall patent is yet another reference from non-analogous art. It has nothing at all to do with casting systems and the protection of a refractory metal core during casting and shell fire. Pearsall relates to high frequency electron discharge devices and thermionic cathodes having improved refractory insulation coated heater wires. It is submitted that this is a vastly different environment from a casting system environment. For example, the materials in Pearsall et al. do not undergo shell fire and the risk of reaction/dissolution with a molten metal material. As a result, one of ordinary skill in the art would not be motivated to combine the references in the manner suggested by the Examiner to use the alumina coating of Pearsall et al.

Further, neither Schenider nor Terpay has a refractory metal core with an etched surface. Since Pearsall does not cure this deficiency, even if the references were properly combined, they would not meet all the limitations of claim 18.

(i) Claim 19 Is Allowable Over The Combination of Schneider Or Terpay in view of Zhao et al.

Claim 19 is directed to a casting system which includes a refractory metal core having means for providing oxidation resistance during shell fire and protection against reaction/dissolution during casting. The casting system further has a top coat overlaying the oxidation resistance and protection means, which top coat is formed from an aluminide.

As noted in the rejection, neither Schneider nor Terpay has a top coat formed from an aluminide.

The Zhao patent is directed to a barrier coating material for a turbine blade or vane. Since it has no relationship to casting systems, it provides no teachings as to how to protect a refractory metal core during casting and shell fire. It is submitted that a turbine blade or vane operates in a much different environment than a refractory metal core in a casting system. For one thing, the turbine blade or vane is not subjected to shell fire. For another thing, the turbine blade or vane does not encounter molten metal material being cast into a desired part. Therefore, one of ordinary skill in the art would not be motivated to modify the refractory metal core in either Schneider or Terpay to have an aluminide top coat.

(j) Claim 24 Is Allowable Over The Combination of Schneider Or Kirtchik in view of Atita

Claim 24 is directed to a casting system including a refractory metal core having means for providing oxidation resistance during shell fire and protection against reaction/dissolution during casting. The refractory metal core is formed from molybdenum and has an etched surface. The oxidation resistance and protection providing means overlaying the etched surface comprises a coating formed by alternating layers of alumina and a material selected from the group consisting of TiCN and zirconia.

Clearly, neither Schneider nor Kirtchik teach or suggest the claimed coating.

The coating shown in the Atita reference is applied to a substrate such as a transport support of glass or plastic, which support is used for applications such as windows, particular cellular telephone windows, etc. There is nothing in the reference which teaches or suggests applying the coating of

Atita to a refractory metal core such as that shown in Schneider or Kirtchik. In order to make out a prima facie case of obviousness, it is not sufficient that an element of a combination is found somewhere in the prior art. There must be something which teaches or suggests the proposed modification or would motivate one of ordinary skill in the art to combine the references. There is nothing in the secondary reference to Atita which teaches or suggests applying the coating to a refractory metal core such as those shown in Schneider or Kirtchik. Certainly, there is nothing in the reference which would motivate one to utilize the Atita coating on a refractory metal core. The rejection is nothing more than a hindsight rejection. Accordingly, this rejection should be reversed.

CONCLUSION

For the foregoing reasons, the Board is hereby requested to reverse the rejections of claims 1, 3 - 12, 14 - 19, 24, and 25 and remand the application to the Primary Examiner for allowance and issuance.

FEES

No fee is believed to be due since Appellants have previously paid an appeal brief fee for the instant application. Should the Director determine that a fee is due, he is hereby authorized to charge said fee to Deposit Account No. 21-0279.

Respectfully submitted,

IN TRIPLICATE

James T. Beals et al.

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I, Karen M. Gill, hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: "Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313" on **July 17, 2006**.

CLAIMS ON APPEAL - APPENDIX A

1. A casting system including a refractory metal core, said refractory metal core having means for providing oxidation resistance during shell fire and protection against reaction/dissolution during casting, said oxidation resistance and protection means being a coating consisting of aluminum silicate.

3. A casting system including a refractory metal core, said refractory metal core having means for providing oxidation resistance during shell fire and protection against reaction/dissolution during casting, said oxidation resistance and protection means being a coating consisting of a layer formed from a silicide.

4. A casting system including a refractory metal core, said refractory metal core having means for providing oxidation resistance during shell fire and protection against reaction/dissolution during casting, said oxidation resistance and protection means being a coating consisting of zirconium silicate.

5. A casting system in accordance with claim 25, wherein said oxide comprises alumina.

6. A casting system in accordance with claim 1, wherein said core is formed from a material selected from the group consisting of molybdenum, tantalum, niobium, tungsten, alloys thereof, and intermetallic compounds thereof.

7. A casting system in accordance with claim 1, wherein said core is formed from molybdenum.

8. A casting system including a refractory metal core, said refractory metal core having means for providing oxidation resistance during shell fire and protection against reaction dissolution during casting, said oxidation resistance and protection means being a coating consisting of an oxide selected from the group consisting of calcia, magnesia, alumina, zirconia, chromia, yttria, silica, and hafnia.

9. A casting system in accordance with claim 8, wherein said coating is chromia and further comprises a chromium coating applied to form said chromia.

10. A casting system in accordance with claim 8, wherein said coating is silica and further comprises a silicide coating applied to form said silica.

11. A casting system including a refractory metal core, said refractory metal core having means for providing oxidation resistance during shell fire and protection against reaction/dissolution during casting, said oxidation resistance and protection means comprising a coating, said coating comprising a nitride selected from the group consisting of silicon nitride, sialon, titanium nitride, and mixtures thereof.

12. A casting system including a refractory metal core, said refractory metal core having means for providing oxidation resistance during shell fire and protection against reaction/dissolution during casting, said oxidation resistance and protection means comprising a coating, said coating

comprising a carbide selected from the group consisting of silicon carbide, titanium carbide, tantalum carbide, and mixtures thereof.

14. A casting system including a refractory metal core, said refractory metal core having means for providing oxidation resistance during shell fire and protection against reaction/dissolution during casting, said oxidation resistance and protection means comprising a coating, said coating comprising a ceramic coating and a layer between the refractory metal forming the refractory metal core and said ceramic coating, wherein said layer comprises a metal selected from the group consisting of nickel, platinum, chromium, silicon, and alloys thereof.

15. A casting system including a refractory metal core, said refractory metal core having means for providing oxidation resistance during shell fire and protection against reaction/dissolution during casting, said oxidation resistance and protection means comprising a coating, said coating comprising a ceramic coating and a layer between the refractory metal forming the refractory metal core and said ceramic coating, wherein said layer is formed from an intermetallic selected from the group consisting of NiAl, and $MoSi_2$.

16. A casting system including a refractory metal core, said refractory metal core having means for providing oxidation resistance during shell fire and protection against reaction/dissolution during casting, said oxidation resistance and protection means comprising a coating, said coating comprising a ceramic coating and a layer between the refractory metal forming the refractory metal core and said ceramic

coating, wherein said layer is formed from a material selected from the group consisting of TiC, TiN, Si_3N_4.

17. A casting system in accordance with claim 14, wherein said ceramic coating comprises an oxide material.

18. A casting system including a refractory metal core, said refractory metal core having means for providing oxidation resistance during shell fire and protection against reaction dissolution during casting, said refractory metal core being formed from molybdenum and having an etched surface and said oxidation resistance and protection providing means comprising a coating overlaying said etched surface, said coating consisting of alumina which has been chemically vapor deposited.

19. A casting system including a refractory metal core, said refractory metal core having means for providing oxidation resistance during shell fire and protection against reaction/dissolution during casting, and further having a top coat overlaying the oxidation resistance and protection means, said top coat being formed from an aluminide.

24. A casting system including a refractory metal core, said refractory metal core having means for providing oxidation resistance during shell fire and protection against reaction/dissolution during casting, said refractory metal core being formed from molybdenum and having an etched surface and said oxidation resistance and protection providing means overlaying said etched surface and comprising a coating, said coating comprising alternating layers of alumina and a material selected from the group consisting of TiCN and zirconia.

25. A casting system including a refractory metal core, said refractory metal core having means for providing oxidation resistance during shell fire and protection against reaction/dissolution during casting, said refractory metal core being formed from a material selected from the group consisting of tantalum, niobium, tungsten, alloys thereof, and intermetallic compounds thereof, and said oxidation resistance and protection means being a coating comprising at least one oxide and/or a silicon containing material.

EVIDENCE - APPENDIX B

NOT APPLICABLE

RELATED PROCEEDINGS - APPENDIX C

NOT APPLICABLE